

=====

Sequence Listing was accepted.

If you need help call the Patent Electronic Business Center at (866)  
217-9197 (toll free).

Reviewer: Anne Corrigan

Timestamp: [year=2009; month=12; day=24; hr=10; min=46; sec=25; ms=165;  
]

=====

Application No: 10527438 Version No: 4.0

Input Set:

Output Set:

Started: 2009-12-04 15:33:02.225  
Finished: 2009-12-04 15:33:03.649  
Elapsed: 0 hr(s) 0 min(s) 1 sec(s) 424 ms  
Total Warnings: 11  
Total Errors: 0  
No. of SeqIDs Defined: 19  
Actual SeqID Count: 19

Error code	Error Description
W 213	Artificial or Unknown found in <213> in SEQ ID (1)
W 213	Artificial or Unknown found in <213> in SEQ ID (2)
W 213	Artificial or Unknown found in <213> in SEQ ID (3)
W 213	Artificial or Unknown found in <213> in SEQ ID (4)
W 213	Artificial or Unknown found in <213> in SEQ ID (5)
W 213	Artificial or Unknown found in <213> in SEQ ID (12)
W 213	Artificial or Unknown found in <213> in SEQ ID (13)
W 213	Artificial or Unknown found in <213> in SEQ ID (15)
W 213	Artificial or Unknown found in <213> in SEQ ID (16)
W 213	Artificial or Unknown found in <213> in SEQ ID (17)
W 213	Artificial or Unknown found in <213> in SEQ ID (18)

# SEQUENCE LISTING

<110> Korea Research Institute of Bioscience and Biotechnology  
 <120> Method for screening of a lipase having improved enzymatic activity using yeast surface display vector and the lipase  
 <130> 26666U  
 <140> 10527438  
 <141> 2005-03-11

<150> PCT/KR03/01820  
 <151> 2003-09-04

<150> KR 2002-55575  
 <151> 2002-09-13

<160> 19

<170> PatentIn version 3.5

<210> 1  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> CALB primer 1

<400> 1  
 ggctcttcag ccactccttt ggtgaag 27

<210> 2  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> CALB primer 2

<400> 2  
 gcggatcctc agggggtgac gat 23

<210> 3  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> CALB primer 3

<400> 3  
 gcggatccgg gggtgacgat gccggag 27

<210>	4	
<211>	19	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	GPD-err primer	
<400>	4	
	gcagagctaa ccaataagg	19
<210>	5	
<211>	19	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	T-0 primer	
<400>	5	
	tgcagttgaa cacaaccac	19
<210>	6	
<211>	1023	
<212>	DNA	
<213>	Candida antarctica	
<400>	6	
	atgaatatat ttacatatt ttgtttttg ctgtcattcg ttcaaggtac cgccactccc	60
	ttggtgaagc gtctgccttc cgggttcggac cctgcctttt cgcagcccaa gtcggtgctc	120
	gatgcgggtc tgacctgcca ggggtgcttcg ccatacctcg tctccaaacc catccttctc	180
	gtccccggaa cgggcaccac aggtccacag tcgttcgact cgaactggat cccctctct	240
	gcgagctgg gttacacacc ctgctggatc tcacccccgc cgttcatget caacgacacc	300
	caggtcaaca cggagtacat ggtcaacgcc atcaccacgc tctacgctgg ttcgggcaac	360
	aacaagcttc cagtgtcac ctggtcccag ggtggtctgg ttgcacagtg gggctctgacc	420
	ttcttcccca gtatcaggtc caaggtcgat cgacttatgg cttttgcgcc cgactacaag	480
	ggcacgctcc tcgccggccc tctcgatgca ctgcgggtta gtgcaccctc cgtatggcag	540
	caaaccaccg gttcggcact cactaccgca ctccgaaacg caggtggtct gaccagatc	600
	gtgccacca ccaacctcta ctcggcgacc gacgagatcg ttcagcctca ggtgtccaac	660
	tcgccactcg actcatccta cctcttcaac gggaagaacg tccaggcaca ggctgtgtgt	720
	gggccgctgt tcgtcatcga ccatgcaggc tcgctcacct cgcagttctc ctacgtcgtc	780

ggtcgatccg cctgcgctc caccacgggc caggctcgta gtgcagacta tggcattacc	840
gactgcaacc ctcttcccg ccaatgatctg actcccgagc aaaaggctcg cgcggtgctg	900
ctcccgggcg cgggggctgc agccatcgctg gcgggtccaa agcagaactg cgagcccgac	960
ctcatgccct acgcccggcc ctttgcagta ggcaaaagga cctgctccgg catcgtcacc	1020
ccc	1023

<210> 7  
 <211> 951  
 <212> DNA  
 <213> Candida antarctica

<400> 7	
ctgccttccg gttcggacc tgccttttcg cagcccaagt cgggtgctga tgcgggtctg	60
acctgccaag gtgcttcgcc atcctcggtc tccaaacca tccttctcgt ccccggaacc	120
ggcaccacag gtccacagtc gttcgactcg aactggatcc ccctctctgc gcagctgggt	180
tacacaccct gctggatctc acccccgccg ttcattgetca acgacacca ggtcaacacg	240
gagtacatgg tcaacgccat caccacgctc tacgctgggt cgggcaacaa caagcttccc	300
gtgctcacct ggtcccagg tggctctggt gcacagtggg gtctgacctt cttccccagt	360
atcaggtcca aggtcgatcg acttatggcc tttgcgccc actacaaggg caccgtcctc	420
gcgggcctc tegatgcact cgcggtagt gcacctccg tatggcagea aaccaccggt	480
tgggactca ctaccgcact ccgaaacgca ggtggctga cccagatcg gccaccacc	540
aacctctact cggcgaccga cgagatcggt cagcctcagg tgtccaact gccactcgac	600
tcactctacc ttttcaacgg aaagaacgct caggcacagg ctgtgtgtgg gccgcagttc	660
gtcatcgacc atgcaggctc gctcacctcg cagttctcct acgtcgtcgg tcgatccgcc	720
ctgcgctcca ccacgggcca ggctcgtagt gcggactatg gcattacgga ctgcaaccct	780
cttcccgcca atgatctgac tcccagcaa aaggctcgcc cggctgcgct cccggcgccg	840
gcggctgcag ccatcgtagg gggtcctaa cagaactgcg agcccgacct catgcctac	900
gccgcccct ttgcagtagg caaaaggacc tgctccggca tcgtcacccc c	951

<210> 8  
 <211> 1023  
 <212> DNA  
 <213> Candida antarctica

<400> 8

atgaatatat tttacatatt tttgtttttg ctgtcattcg ttcaaggtac cgccactcct	60
ttggtgaagc gtctgccttc cgggttcggac cctgcctttt cgcagcccaa gtcggtgctc	120
gatgcgggtc tgacctgcca ggggtgcttcg ccatcctcgg tctccaaacc catccttctc	180
gtccccggaa ccggcaccac aggtccacag tcgttcgact cgaactggat cccctctct	240
gcgcagctgg gttacacacc ctgctggatc tcacccccgc cgttcatgct caacgacacc	300
caggtcaaca cggagtacat ggtcaacgcc atcaccacgc tctacgctgg ttcgggcaac	360
aacaagcttc ccgtgctcac ctgggtccag ggtggtctgg ttgcacagtg gggctctgacc	420
ttcttcccca gtatcaggtc caaggctgat cgacttatgg cctttgcgcc cgactacaag	480
ggcaccgtcc tcgccggccc tctcgatgca ctgcgggta gtgcaccctc cgtatggcag	540
caaaccaccg gttcggcact cactaccgca ctccgaaacg caggtggtct gaccagatc	600
gtgcccacca ccaacctcta ctggcgacc gacgagatcg ttcagcctca ggtgtccaac	660
tcgccactcg actcatccta cctcttcaac ggaaagaacg tccaggcaca ggctgtgtgt	720
gggccgcagt tcgtcatcga ccatgcaggc tcgtcacct cgcagttctc ctacgtcgtc	780
ggtcgatccg cctgcgctc caccacgggc caggctcgta gtgcagacta tggcattacg	840
gactgcaacc ctcttccgc caatgatctg actcccgagc aaaaggtcgc cgcggctgcg	900
ctctggcgc cggcggctgc agccatcgtg gcgggtccaa agcagaactg cgagcccgac	960
ctcatgccct acgccgccc ctttgcagta ggcaaaagga cctgctccgg catcgtcacc	1020
ccc	1023

<210> 9  
 <211> 319  
 <212> PRT  
 <213> Candida antarctica

<400> 9

Leu	Pro	Ser	Gly	Ser	Asp	Pro	Ala	Phe	Ser	Gln	Pro	Lys	Ser	Val	Leu
1				5						10					15

Asp	Ala	Gly	Leu	Thr	Cys	Gln	Gly	Ala	Ser	Pro	Ser	Ser	Val	Ser	Lys
			20						25					30	

Pro	Ile	Leu	Leu	Val	Pro	Gly	Thr	Gly	Thr	Thr	Gly	Pro	Gln	Ser	Phe
		35						40				45			

Asp	Ser	Asn	Trp	Ile	Pro	Leu	Ser	Ala	Gln	Leu	Gly	Tyr	Thr	Pro	Cys
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

50

55

60

Trp Ile Ser Pro Pro Pro Phe Met Leu Asn Asp Thr Gln Val Asn Thr  
 65 70 75 80

Glu Tyr Met Val Asn Ala Ile Thr Thr Leu Tyr Ala Gly Ser Gly Asn  
 85 90 95

Asn Lys Leu Pro Val Leu Thr Trp Ser Gln Gly Gly Leu Val Ala Gln  
 100 105 110

Trp Gly Leu Thr Phe Phe Pro Ser Ile Arg Ser Lys Val Asp Arg Leu  
 115 120 125

Met Ala Phe Ala Pro Asp Tyr Lys Gly Thr Val Leu Ala Gly Pro Leu  
 130 135 140

Asp Ala Leu Ala Val Ser Ala Pro Ser Val Trp Gln Gln Thr Thr Gly  
 145 150 155 160

Ser Ala Leu Thr Thr Ala Leu Arg Asn Ala Gly Gly Leu Thr Gln Ile  
 165 170 175

Val Pro Thr Thr Asn Leu Tyr Ser Ala Thr Asp Glu Ile Val Gln Pro  
 180 185 190

Gln Val Ser Asn Ser Pro Leu Asp Ser Ser Tyr Leu Phe Asn Gly Lys  
 195 200 205

Asn Val Gln Ala Gln Ala Val Cys Gly Pro Leu Phe Val Ile Asp His  
 210 215 220

Ala Gly Ser Leu Thr Ser Gln Phe Ser Tyr Val Val Gly Arg Ser Ala  
 225 230 235 240

Leu Arg Ser Thr Thr Gly Gln Ala Arg Ser Ala Asp Tyr Gly Ile Thr  
 245 250 255

Asp Cys Asn Pro Leu Pro Ala Asn Asp Leu Thr Pro Glu Gln Lys Val  
 260 265 270

Ala Ala Ala Ala Leu Pro Ala Pro Ala Ala Ala Ala Ile Val Ala Gly  
 275 280 285

Pro Lys Gln Asn Cys Glu Pro Asp Leu Met Pro Tyr Ala Arg Pro Phe  
290 295 300

Ala Val Gly Lys Arg Thr Cys Ser Gly Ile Val Thr Pro Gly Ser  
305 310 315

<210> 10  
<211> 319  
<212> PRT  
<213> Candida antarctica

<400> 10

Leu Pro Ser Gly Ser Asp Pro Ala Phe Ser Gln Pro Lys Ser Val Leu  
1 5 10 15

Asp Ala Gly Leu Thr Cys Gln Gly Ala Ser Pro Ser Ser Val Ser Lys  
20 25 30

Pro Ile Leu Leu Val Pro Gly Thr Gly Thr Thr Gly Pro Gln Ser Phe  
35 40 45

Asp Ser Asn Trp Ile Pro Leu Ser Ala Gln Leu Gly Tyr Thr Pro Cys  
50 55 60

Trp Ile Ser Pro Pro Pro Phe Met Leu Asn Asp Thr Gln Val Asn Thr  
65 70 75 80

Glu Tyr Met Val Asn Ala Ile Thr Thr Leu Tyr Ala Gly Ser Gly Asn  
85 90 95

Asn Lys Leu Pro Val Leu Thr Trp Ser Gln Gly Gly Leu Val Ala Gln  
100 105 110

Trp Gly Leu Thr Phe Phe Pro Ser Ile Arg Ser Lys Val Asp Arg Leu  
115 120 125

Met Ala Phe Ala Pro Asp Tyr Lys Gly Thr Val Leu Ala Gly Pro Leu  
130 135 140

Asp Ala Leu Ala Val Ser Ala Pro Ser Val Trp Gln Gln Thr Thr Gly  
145 150 155 160



Ser Ala Leu Thr Thr Ala Leu Arg Asn Ala Gly Gly Leu Thr Gln Ile  
165 170 175

Val Pro Thr Thr Asn Leu Tyr Ser Ala Thr Asp Glu Ile Val Gln Pro  
180 185 190

Gln Val Ser Asn Ser Pro Leu Asp Ser Ser Tyr Leu Phe Asn Gly Lys  
195 200 205

Asn Val Gln Ala Gln Ala Val Cys Gly Pro Gln Phe Val Ile Asp His  
210 215 220

Ala Gly Ser Leu Thr Ser Gln Phe Ser Tyr Val Val Gly Arg Ser Ala  
225 230 235 240

Leu Arg Ser Thr Thr Gly Gln Ala Arg Ser Ala Asp Tyr Gly Ile Thr  
245 250 255

Asp Cys Asn Pro Leu Pro Ala Asn Asp Leu Thr Pro Glu Gln Lys Val  
260 265 270

Ala Ala Ala Ala Leu Pro Ala Pro Ala Ala Ala Ala Ile Val Ala Gly  
275 280 285

Pro Lys Gln Asn Cys Glu Pro Asp Leu Met Pro Tyr Ala Arg Pro Phe  
290 295 300

Ala Val Gly Lys Arg Thr Cys Ser Gly Ile Val Thr Pro Gly Ser  
305 310 315

<210> 11  
<211> 317  
<212> PRT  
<213> Candida antarctica

<400> 11

Leu Pro Ser Gly Ser Asp Pro Ala Phe Ser Gln Pro Lys Ser Val Leu  
1 5 10 15

Asp Ala Gly Leu Thr Cys Gln Gly Ala Ser Pro Ser Ser Val Ser Lys  
20 25 30

Pro Ile Leu Leu Val Pro Gly Thr Gly Thr Thr Gly Pro Gln Ser Phe  
35 40 45

Asp Ser Asn Trp Ile Pro Leu Ser Ala Gln Leu Gly Tyr Thr Pro Cys  
50 55 60

Trp Ile Ser Pro Pro Pro Phe Met Leu Asn Asp Thr Gln Val Asn Thr  
65 70 75 80

Glu Tyr Met Val Asn Ala Ile Thr Thr Leu Tyr Ala Gly Ser Gly Asn  
85 90 95

Asn Lys Leu Pro Val Leu Thr Trp Ser Gln Gly Gly Leu Val Ala Gln  
100 105 110

Trp Gly Leu Thr Phe Phe Pro Ser Ile Arg Ser Lys Val Asp Arg Leu  
115 120 125

Met Ala Phe Ala Pro Asp Tyr Lys Gly Thr Val Leu Ala Gly Pro Leu  
130 135 140

Asp Ala Leu Ala Val Ser Ala Pro Ser Val Trp Gln Gln Thr Thr Gly  
145 150 155 160

Ser Ala Leu Thr Thr Ala Leu Arg Asn Ala Gly Gly Leu Thr Gln Ile  
165 170 175

Val Pro Thr Thr Asn Leu Tyr Ser Ala Thr Asp Glu Ile Val Gln Pro  
180 185 190

Gln Val Ser Asn Ser Pro Leu Asp Ser Ser Tyr Leu Phe Asn Gly Lys  
195 200 205

Asn Val Gln Ala Gln Ala Val Cys Gly Pro Gln Phe Val Ile Asp His  
210 215 220

Ala Gly Ser Leu Thr Ser Gln Phe Ser Tyr Val Val Gly Arg Ser Ala  
225 230 235 240

Leu Arg Ser Thr Thr Gly Gln Ala Arg Ser Ala Asp Tyr Gly Ile Thr  
245 250 255

Asp Cys Asn Pro Leu Pro Ala Asn Asp Leu Thr Pro Glu Gln Lys Val  
260 265 270

Ala Ala Ala Ala Leu Leu Ala Pro Ala Ala Ala Ala Ile Val Ala Gly  
275 280 285

Pro Lys Gln Asn Cys Glu Pro Asp Leu Met Pro Tyr Ala Arg Pro Phe  
290 295 300

Ala Val Gly Lys Arg Thr Cys Ser Gly Ile Val Thr Pro  
305 310 315

<210> 12  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> CALB primer 4

<400> 12  
ctcatatgct accttccggt tcggac

26

<210> 13  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> a-amylase secretion signal

<400> 13

Met Met Val Ala Trp Trp Ser Leu Phe Leu Tyr Gly Leu Gln Val Ala  
1 5 10 15

Ala Pro Ala Leu Ala  
20

<210> 14  
<211> 317  
<212> PRT  
<213> Candida antarctica

<400> 14

Leu Pro Ser Gly Ser Asp Pro Ala Phe Ser Gln Pro Lys Ser Val Leu  
1 5 10 15

Asp Ala Gly Leu Thr Cys Gln Gly Ala Ser Pro Ser Ser Val Ser Lys  
20 25 30

Pro	Ile	Leu	Leu	Val	Pro	Gly	Thr	Gly	Thr	Thr	Gly	Pro	Gln	Ser	Phe	35	40	45
Asp	Ser	Asn	Trp	Ile	Pro	Leu	Ser	Ala	Gln	Leu	Gly	Tyr	Thr	Pro	Cys	50	55	60
Trp	Ile	Ser	Pro	Pro	Pro	Phe	Met	Leu	Asn	Asp	Thr	Gln	Val	Asn	Thr	65	70	75
Glu	Tyr	Met	Val	Asn	Ala	Ile	Thr	Thr	Leu	Tyr	Ala	Gly	Ser	Gly	Asn	85	90	95
Asn	Lys	Leu	Pro	Val	Leu	Thr	Trp	Ser	Gln	Gly	Gly	Leu	Val	Ala	Gln	100	105	110
Trp	Gly	Leu	Thr	Phe	Phe	Pro	Ser	Ile	Arg	Ser	Lys	Val	Asp	Arg	Leu	115	120	125
Met	Ala	Phe	Ala	Pro	Asp	Tyr	Lys	Gly	Thr	Val	Leu	Ala	Gly	Pro	Leu	130	135	140
Asp	Ala	Leu	Ala	Val	Ser	Ala	Pro	Ser	Val	Trp	Gln	Gln	Thr	Thr	Gly	145	150	155
Ser	Ala	Leu	Thr	Thr	Ala	Leu	Arg	Asn	Ala	Gly	Gly	Leu	Thr	Gln	Ile	165	170	175
Val	Pro	Thr	Thr	Asn	Leu	Tyr	Ser	Ala	Thr	Asp	Glu	Ile	Val	Gln	Pro	180	185	190
Gln	Val	Ser	Asn	Ser	Pro	Leu	Asp	Ser	Ser	Tyr	Leu	Phe	Asn	Gly	Lys	195	200	205
Asn	Val	Gln	Ala	Gln	Ala	Val	Cys	Gly	Pro	Leu	Phe	Val	Ile	Asp	His	210	215	220
Ala	Gly	Ser	Leu	Thr	Ser	Gln	Phe	Ser	Tyr	Val	Val	Gly	Arg	Ser	Ala	225	230	235
Leu	Arg	Ser	Thr	Thr	Gly	Gln	Ala	Arg	Ser	Ala	Asp	Tyr	Gly	Ile	Thr	245	250	255

Asp Cys Asn Pro Leu Pro Ala Asn Asp Leu Thr Pro Glu Gln Lys Val  
260 265 270

Ala Ala Ala Ala Leu Leu Ala Pro Ala Ala Ala Ala Ile Val Ala Gly  
275 280 285

Pro Lys Gln Asn Cys Glu Pro Asp Leu Met Pro Tyr Ala Arg Pro Phe  
290 295 300

Ala Val Gly Lys Arg Thr Cys Ser Gly Ile Val Thr Pro  
305 310 315

<210> 15  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> LQ53 primer

<400> 15  
gctgtgtgtg ggccgcagtt cgtcatcg 28

<210> 16  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> LQ35 primer

<400> 16  
gcatggtcga tgacgaactg cggcccacac 30

<210> 17  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> LP53 primer

<400> 17  
gtcgccgcgg ctgcgctccc ggcgcggcg 30

<210> 18  
<211> 29  
<212> DNA  
<213>